

REMARKS

A. Request for Reconsideration

Applicant has carefully considered the matters raised by the Examiner in the outstanding Office Action but remains of the position that patentable subject matter is present. Applicant respectfully requests reconsideration of the Examiner's position based on the amendments to the claims and the following remarks.

B. The Invention

The present invention is directed to an active ray curable type aqueous ink and an image forming method using the ink.

In one of the novel aspects of the invention, the ink contains a non-ionic surfactant. The non-ionic surfactant, compared to a cationic or anionic surfactant, produces an ink with high definition after printing, good durability for color mixing, and good image flatness.

In another novel aspect of the invention, the ink includes a light curable type aqueous resin composition.

C. Claim Status and Amendments

Claims 1-16 are presented for continued prosecution. Claims 13-16 have been added by this amendment.

Claims 1 and 4 have been amended to correct minor grammatical errors.

New claims 13 and 14 recite that the ink includes an organic solvent in an amount of 0 to 3%. Support for this amendment can be found in par. 3 on page 30 of the application.

New claims 15 and 16 recite that the non-ionic surfactant is present in an amount of 20 to 1,000 ppm. Support for this amendment can be found in par. 3 on page 26 of the application.

D. The Office Action

Claims 1, 4, and 7-12 had been rejected as being unpatentable over Chatterjee (U.S. 5,985,984) in view of Noguchi (U.S. 2002/0065335). Claims 2, 3, 5, and 6 had been rejected as being unpatentable over Chatterjee in view of Noguchi and Owatari (U.S. 6,095,645).

Chatterjee had been cited to teach a light curable aqueous resin composition having a polymerizable compound, an aqueous photopolymerization initiator, and a non-ionic surfactant. Noguchi had been cited to teach a polymerizable compound which polymerizes with radical polymerization by water and an active ray. The Examiner stated that it would be obvious to replace the polymerizable compound of Chatterjee with the polymerizable compound of Noguchi.

1. Chatterjee and Noguchi do not teach or suggest the criticality of using a non-ionic surfactant

The ink of Chatterjee includes either an anionic surfactant, a cationic surfactant, or a non-ionic surfactant (col. 8, lines 15-19). Thus, Chatterjee teaches three distinct surfactants. Moreover, Chatterjee equates these three surfactants, because Chatterjee does not suggest that a non-ionic surfactant is preferred compared to an anionic or cationic surfactant.

Noguchi teaches the use of an anionic surfactant (par. 86). Noguchi does not teach a non-ionic surfactant. Thus, neither Chatterjee nor Noguchi teach or suggest the superiority of a non-ionic surfactant.

Furthermore, a proper combination of Chatterjee and Noguchi would result in an anionic surfactant, because Noguchi teaches that an anionic surfactant is used with his polymerizable compound.

Turning now to the test data in this case, Applicant previously submitted the August 24, 2006 Declaration to demonstrate the criticality of employing a non-ionic surfactant compared to anionic and cationic surfactants. The August 24 Declaration summarized the Examples reported on pages 40-60 of the present application.

In Tables 3-1 and 3-2 on pages 52-53 of the present application, Inventive samples 13-32 (non-ionic surfactant) are superior to Comparative samples 1-4 (no surfactant), Comparative samples 5-8 (cationic surfactant), and a Comparative sample 9-12 (anionic surfactant). The composition of samples 1-32 is shown in the Tables on pages 42, 43, 47, and 48 of the application (note that surfactant/detergents 1 and 2 are anionic or cationic, while surfactants/detergents 3-6 are non-ionic).

Tables 3-1 and 3-2 on pages 52 and 53 of the application therefore demonstrate the criticality of employing the claimed non-ionic surfactant compared to anionic and cationic surfactants. As mentioned above, Chatterjee does not teach or suggest that a non-ionic surfactant is superior to an anionic or cationic surfactant. Rather, Chatterjee equates these three surfactants.

In section 4 of the August 24 Declaration, Mr. Ishikawa declared as one of skill in the art that he is surprised that a non-ionic surfactant performed better than a cationic or anionic surfactant. Based on these unexpected results, Applicant respectfully submits that the claimed invention is not obvious based on the combination of Chatterjee and Noguchi.

Thus, not only does Chatterjee and Noguchi not result in the claimed combination, but the test data demonstrates the surprising and unexpected results of the present invention.

2. It would not be obvious to combine the teachings of Chatterjee and Noguchi

Claims 1 and 4 recite that the ink includes a light curable type aqueous resin composition.

The water present in the aqueous resin composition vaporizes when the ink cures. Thus, water is employed in an aqueous ink for a specific purpose.

The Examiner cited col. 1, lines 12-21 and col. 2, lines 20-25 of Chatterjee to teach a light curable aqueous resin composition. Applicant respectfully disagrees with the Examiner's reading of Chatterjee.

The cited sections and the entire Chatterjee patent do not teach an aqueous resin composition. Rather, the resin in col. 2, lines 20-44 of Chatterjee is a guanamine resin. Guanamine resins are not curable compounds, and they do not contain water. Rather, guanamine resins are binders that regulate the viscosity of the ink. As a result, when the ink of Chatterjee cures, the guanamine resin remains in the cured ink.

The cited sections of Chatterjee therefore teach a guanamine resin that remains in the cured ink, not an aqueous resin composition, i.e. water and a resin, as recited in claims 1 and 4. The reaction system of Chatterjee's ink is therefore completely different from the reaction system of the aqueous ink of the present invention. Applicant therefore respectfully

submits that the present invention is not obvious on the teachings of Chatterjee, because Chatterjee does not teach or suggest the aqueous resin composition of claims 1 and 4.

Noguchi had been cited to teach a polymerizable compound which polymerizes with radical polymerization by water and an active ray. However, there is absolutely no teaching or suggestion in either Chatterjee or Noguchi that the guanamine resin of Chatterjee is equivalent to, or can be replaced by, the aqueous resin of Noguchi with any reasonable expectation that it would work for the intended purpose of a ray curable ink.

Furthermore, it is submitted that it fly's in the face of scientific logic to replace a non-aqueous composition with an aqueous composition. The two compositions are diametrically opposed to one another.

Applicant therefore does not see any teaching, suggestion or motivation in Chatterjee or Noguchi to replace the guanamine resin of Chatterjee with the aqueous resin of Noguchi. Applicant therefore respectfully submits that claims 1 and 4 are not obvious based on the combination of Chatterjee and Noguchi.

3. The combination of the claimed aqueous resin composition with a non-ionic surfactant

Chatterjee teaches a non-aqueous ink without specifying the criticality of a non-ionic surfactant. Noguchi teaches an

aqueous ink with an anionic surfactant. Thus, neither reference teaches an aqueous resin composition with a non-ionic surfactant as recited in claims 1 and 4.

The criticality of employing an aqueous resin composition with a non-ionic surfactant was demonstrated in the August 24, 2006 Declaration as explained in section 1 above. Applicant respectfully submits that it would not be obvious to employ an aqueous resin composition in combination with a non-ionic surfactant based on the August 24 2006 Declaration.

4. Claims 13 and 14

Claims 13 and 14 recite that the ink includes an organic solvent in an amount of 0 to 3%. The small amount of the organic solvent recited in claims 13 and 14 improves adhesiveness of the ink to a recording medium (par. 3 on page 30 of the application).

Noguchi teaches an organic solvent in an amount of 5-20%. This range is higher than the range recited in claims 13 and 14.

Noguchi is clearly teaching a much larger amount of the organic solvent. Thus, Noguchi does not recognize that a small amount of the organic solvent is desirable to improve adhesiveness to a recording medium.

Applicant therefore respectfully submits that the range of claims 13 and 14 is not obvious based on the teachings of Noguchi.

E. Pages 5, 6, and 7 of the Office Action

Page 5 of the Office Action is blank, while pages 6 and 7 appear to be directed to a different application. Applicant has not replied to pages 5-7 of the Office Action, since it appears that pages 5-7 were mistakenly included in the Office Action.

F. Conclusion

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance and such action is respectfully requested. Should any extensions of time or fees be necessary in order to maintain this Application in pending condition, appropriate requests are hereby made and authorization is given to debit Account # 02-2275.

Respectfully submitted,

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